2022 Appropriations Request

Genomic Excellence Project

Utah Cold Case Coalition/Intermountain Forensics Timeline

- 2018- Founded in order to assist families and the public with unsolved murders, missing persons, and unidentified human remains.
- 2019- Establishes Intermountain Forensics
  - Co-founded by former Lab Director of Sorenson Forensics
  - Lab Director known throughout industry, frequent speaker at forensic conferences
  - Staffed by court-qualified DNA experts, other personnel with decades of experience
  - Wide range of current clients include Salt Lake City PD, FBI, State of Connecticut, City of Tulsa (Race Massacre Commission), Pima County Sheriff's Office, University of Adelaide, etc.
- 2021- IMF receives ANAB ISO/IEC 17025:2017 Accreditation

ANAB
ANSI National Accreditation Board

CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Intermountain Forensics
4885 South 900 East, Suite 300, Salt Lake City, Utah 84117 USA

Fulfills the requirements of

ISO/IEC 17025:2017
ANAB Forensic Testing & Calibration AR 3125:2019
FBI Quality Assurance Standards for Forensic DNA Testing Laboratories:2020

In the field of

Forensic Testing

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

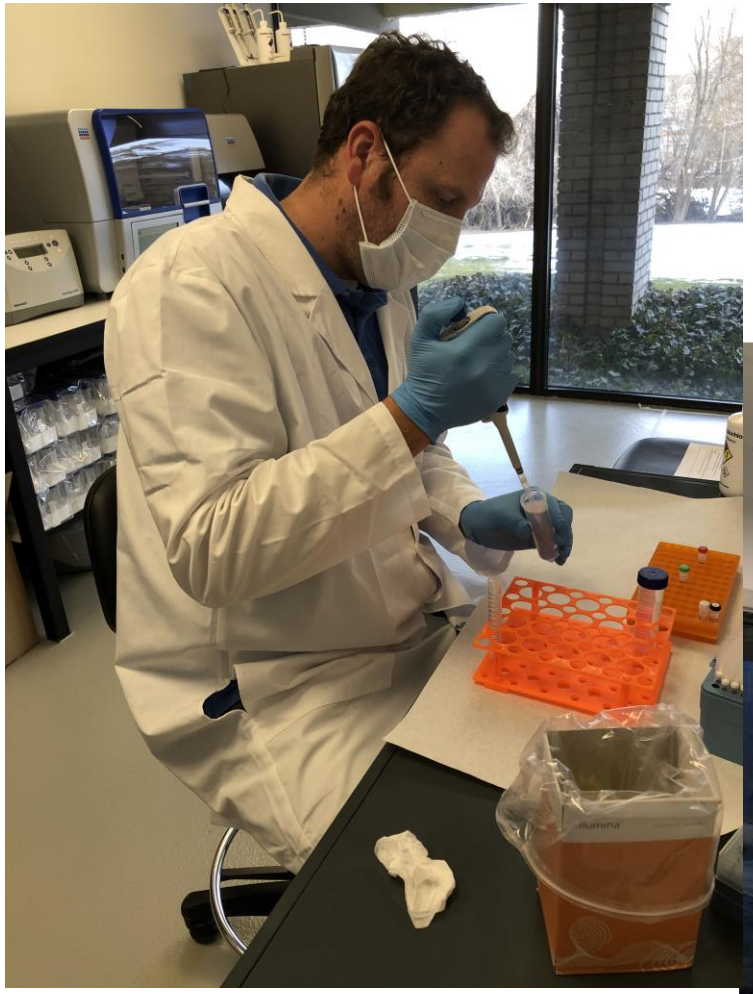
Pamela L. Sale, Vice President, Forensics

Expiry Date: 31 August 2025
Certificate Number: FT-0359

ANAB
ANSI National Accreditation Board
ilac-MRA

Accredited Forensic DNA labs in U.S. are scarce

- Law enforcement, courts prefer/require labs Accredited by ANSI National Accreditation Board (ANAB)
- Must be Accredited to bid on most gov't contracts. Only 2-3 labs regularly bid (Bode, DNA Labs Int'l, IMF. Recent examples: Connecticut (only bidders IMF, Bode, DLI); Fresno (IMF, Bode); Tulsa Race Massacre (IMF, Bode, DLI)
- Accreditation = time consuming & expensive (>$1m + 1-2 years)

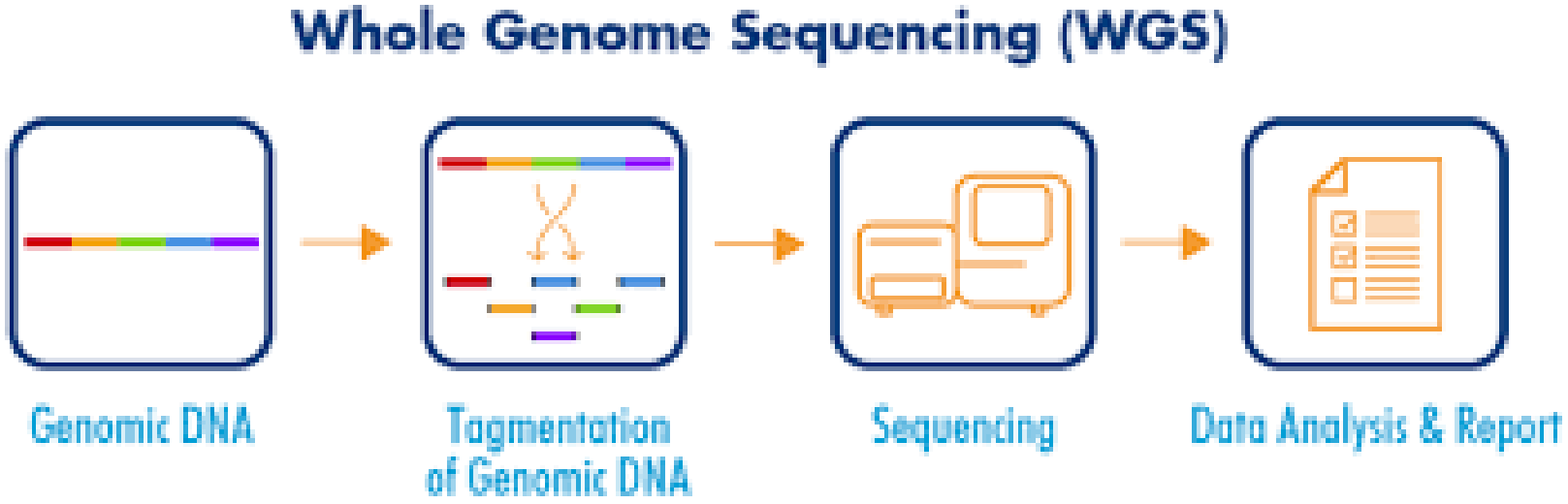

illumina


Air Science

Project Objectives

- 1. To validate and implement whole genome sequencing at Intermountain Forensics, which would enable law enforcement to have advanced DNA profiles created and utilize the investigative tools of forensic genealogy at low cost in order to solve active and cold cases within the state;
- 2. To assist law enforcement in identifying all known Jane/John Does in the state, placing Utah at the forefront of cold case investigation solves rates; and
- 3. Create a Y-STR database that would be a vital investigative tool for cases involving DNA.

Whole Genome Sequencing



WHAT IS FORENSIC WHOLE GENOME SEQUENCING?

- 1 – extract DNA from old, degraded sample *(bones, teeth, clothing, Sexual Assault Kits)*, check quality/quantity, amplify
- 2 – sequence entire human genome (3-10,000,000 single nucleotide polymorphisms (SNPs))
- 3 – remove non-forensic SNPs using bioinformatics
- 4 – upload final profile to voluntary DNA databases for comparison

Government crime labs lack capacity to perform Whole Genome Sequencing

- Most government labs do not yet have equipment or capacity to perform Whole Genome Sequencing
- Many crime labs are already outsourcing normal (non-WGS) functions and testing to private labs due to budget, staffing issues
- Law enforcement samples currently 100% outsourced to single for-profit company in Texas

"As more and more DNA samples are sent to the nation's crime laboratories each year, the backlog of unprocessed samples continues to grow. Laboratories continually improve their processing speed and efficiency, with help from NIJ research and development funding. Despite increased capacity, backlogs nevertheless remain a persistent issue because demand for DNA analysis is growing too quickly for capacity to keep pace." *"Helping Labs Increase Capacity and Reduce Backlogs," National Institute of Justice Journal 281 (5-19-2019)*

Only 1 lab in U.S. offering forensic Whole Genome Sequencing

- Only source of forensic Whole Genome Sequencing in United States is commercial lab Othram in Texas

- Othram = successful, but not Accredited

A decade ago, sequencing the entire human genome cost $1b and took 13 years. With the Illumina Novaseq 6000 Next Generation Sequencer, 24+ samples can be sequenced in 48 hours

<u>No money requested for acquiring equipment</u> - to be donated by third party

Doe Identification

"Cold Case Crisis"

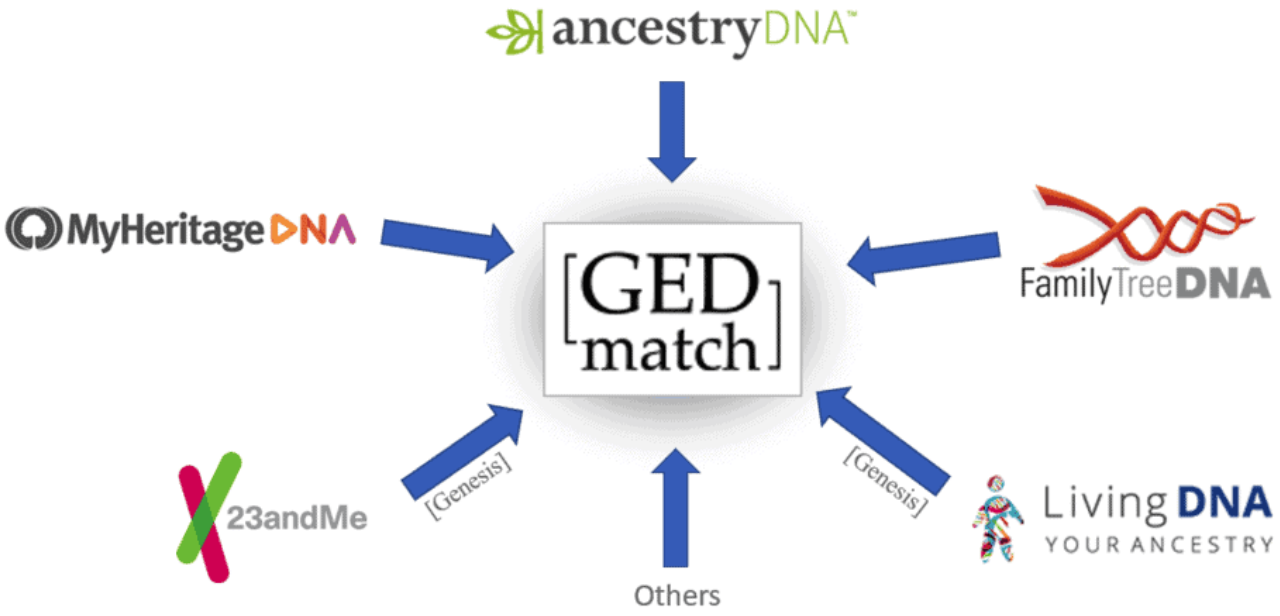
- 248,933+ unsolved murders in U.S. since 1980 *(FBI Uniform Crime Reports and the Murder Accountability Project; "Cold Case Crisis" 2020 Department of Justice report)*
- Est. 100,000+ additional unsolved murders from 1960-1979 *(Utah Cold Case Coalition research)*
- 40,000+ unidentified bodies *("conservative" estimate by Clark County Coroner Mike Evans; 13,894 uploaded to date to NAMUS.gov)*
- Additional "Does" being exhumed for identification *(e.g., https://www.kgun9.com/news/local-news/medical-examiner-exhumes-66-bodies-to-collect-dna-i-d-remains, 12/29/2021; 20,000+ post-1960 Does in Findagrave.com)*

High public interest in resolving cold cases with new DNA methods

- “Cold case” explosion
- Websites, podcasts, TV shows, books, families increasing pressure to perform new / advanced DNA testing. *(Image: recent CSI reboot focusing on new DNA methods and Whole Genome Sequencing)*
- Examples of cases solved using WGS: Golden State Killer; Phoenix Canal Murders; Bear Brook Murders; NorCal Rapist; Clearfield Rapist; Sherry Black murder (mother-in-law of Utah Jazz owner); Washoe County Jane Doe; Buckskin Girl

Deeper DNA testing (Whole Genome Sequencing) is needed for cold cases

- Using basic testing, DNA from cold cases has usually been compared to criminal database (CODIS) with no hits
- Deeper testing – Whole Genome Sequencing – is needed to create DNA profiles to upload to general public (genealogy) databases such as GEDMatch
- Genetic genealogists compare cold case profile to millions of profiles voluntarily uploaded by public who have tested with companies like Ancestry.com



Y-STR Database

Uses of Y-STR Testing

- STR testing is the standard for DNA profile testing, however YSTR testing is an important tool when evaluating evidence with multiple samples (ei sexual assault kits)
- YSTR can target male-only DNA in mixed samples
- CODIS cannot search for YSTR matches, samples must be compared to a separate database

Genomic Excellence Project Impact

The Genomic Excellence Project would place Utah at forefront of forensic DNA in United States:

- Provide Accredited forensic Whole Genome Sequencing to law enforcement throughout Utah and U.S., and at nonprofit pricing
- Project would provide DNA and other work needed to identify all of Utah's ~40 unidentified bodies (cold cases only; no overlap with Medical Examiner on more recent identifications). Would make Utah only state in the union to attempt to identify all unidentified remains within its borders.
- Center would create Y-STR and mitochondrial database, needed to enable law enforcement to develop leads from degraded samples suitable for (partial or complete) Y or mt profiles but not whole autosomal (genealogical) profiles.